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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,607	07/19/2006	Tetsuya Kohno	293159US3PCT	5945
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
DIAZ, THOMAS C				
ART UNIT		PAPER NUMBER		
3656				
NOTIFICATION DATE		DELIVERY MODE		
01/20/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com

oblonpat@oblon.com

jgardner@oblon.com

# Office Action Summary

## Application No.

10/586,607

## Applicant(s)

KOHNO ET AL.

## Examiner

THOMAS DIAZ

## Art Unit

3656

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 15-24, 26 and 27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-24, 26 and 27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/17/2009 has been entered.

***Specification***

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The limitations wherein a thickness of the casing in the given rotational direction at the third corner portion is larger than a thickness of the casing in the given rotational direction at the second corner portion as described in claim 27. These limitations do not appear to be explicitly disclosed in the written disclosure.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**Claim 15-23 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.**

Claim 15 recites the first corner portion has increased strength relative to other corner portions of the openings of the casing. However, the disclosure does not have support for this limitation since the disclosure only mentions that the first and third corners would have increased strength as a result of either the heat or physical treatment done upon them. There is no specific disclosure that mentions that the first corner has greater strength than all the other corners (which would include the third corner). Therefore, this limitation is not enabled by the specification as originally filed.

Claim 24 recites "adjacent corner portions to the first corner portion are not heat treated corner portions." The disclosure does not provide support for the adjacent corner portions not being heat treated. The disclosure merely discloses that the first and third corners may be heat treated. It does not exclude the other corner portions. Accordingly, this negative limitation is not supported by the specification. Also, see MPEP 2173.05 (i) for more information on negative limitations in claims.

**Claim 27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claim 27 recites the limitation "the second corner portion". There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 15-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downs et al. (USP 5951431) in view of Gage et al. (USP 6139462), and further in view of Fushimi et al. (EP 0371340).**

Regarding claim 15, Downs et al. discloses a similar device comprising a casing (fig.3, 112) that defines an internal space (fig.3; inside of casing) and an opening (fig.3, 122a) communicated with the internal space and that is rotatable in a given rotational direction and in a rotational direction opposite to the given rotational direction, the casing including an input portion (fig.3, 38) in which the driving force is input, [the casing being configured such that fatigue life of the casing when the driving force is repeatedly input in the input portion in the given rotational direction is greater than fatigue life of the casing when the driving force

is repeatedly input in the input portion in the rotational direction opposite to the given rotational direction, rotation in the given direction being a rotation around a longitudinal rotational axis of the differential gear casing;]

Regarding the functional recitation(s) in the claim(s) above denoted by the "[ ]" the examiner notes while features of an apparatus may be recited either structurally or functionally, claims directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. The reference discloses all the claimed structural limitations and therefore anticipates the claim. See MPEP 2114. Additionally, the apparatus is capable of performing the claimed functions.

Downs et al. discloses a dividing mechanism (fig.9, 34) that is provided in the internal space, and includes a pinion (fig.9, 34) and that divides the driving force into the first output and the second output; and a support member (fig.9, 30) that is provided so as to contact the casing and so as to support the dividing mechanism and that includes a pinion shaft (fig.9, 30) that supports the pinion such that the pinion can rotate on its axis and which makes the pinion revolve around a center of the casing, wherein the fatigue life of the casing is adjusted by making a shape of the opening asymmetrical with respect to the longitudinal rotational axis of the casing (fig.3 and fig.4 show the opening is asymmetrical), wherein the opening is in a basically elliptical shape (see fig.3) having a round shape at each of corner portions, and the round shapes of adjacent corner portions are different from each other (fig.3, shape of 152 and shape of 154 are different), wherein a portion at which the fatigue life of the casing is increased is a first corner at which the tensile stress is generated when forward driving force is input

(fig.3, 152 or 122a); fatigue life is increased here due to the shape of the opening and its symmetry with respect to the longitudinal axis), wherein a curvature radius of the round shape of the first corner portion of the opening, where a tensile stress is generated when the driving force is input in the given rotational direction (fig.3, 152), is larger than a curvature radius of the round shape of a second corner portion of the opening (fig.3, 154 or 155c), where a compression stress is generated when the driving force is input in the given rotational direction,

Downs et al. fails to disclose the fatigue life of the casing is also adjusted by heat treatment, and wherein the first corner portion of the opening of the casing is a heat treated corner portion and wherein the first corner portion has increased strength relative to other corner portions of the opening of the casing (due to heat treatment).

Gage et al. teaches the use of heat treatment on sections of differential gear casings for the purpose of providing higher strength and longer wear characteristics and to eliminate residual stresses and making stress concentrations more uniform (col.1, lines 40-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the casing disclosed by Downs et al. to be heat treated at the first corner portion or any of the corner portions where the stress concentrations demanded such treatment; for the purpose of providing higher strength and longer wear characteristics and to eliminate residual stresses and making stress concentrations more uniform (col.1, lines 40-55) since it is known in light of the prior art certain sections of differential casings should be heat treated to improve wear characteristics.

Gage et al. is silent to the first corner portion being of increased strength relative to the other corner portions.

Fushimi et al. teaches the concept of providing variable surface hardness to various areas of a gear tooth according as a result of the stresses and/or fatigue life required on the different sections of the gear tooth (page 4, lines 22-44).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention to apply the concept taught by Fushimi et al. to differential casing disclosed by Downs et al., in particular by providing the first corner portion (or any other corner portion) with increased strength relative to the other portions for the purpose of accurately controlling durability of the gear casing according to the specific stresses or conditions required during use of the casing.

Regarding claim 16, Downs et al. discloses the casing includes a support portion (fig.6, 20) that contacts the support member, and the fatigue life is measured by inputting the driving force in the input portion without rotating the support portion.

Regarding claim 17, Downs et al. discloses the casing includes an output portion (fig.3, 40) that is provided at a position that is different from a position of the support portion, and the fatigue life is measured by inputting the driving force in the input portion without rotating the output portion.

Regarding claim 18, Gage et al. discloses the use of carburizing or induction hardening as the form of heat treatment (col.1, line 40-45).



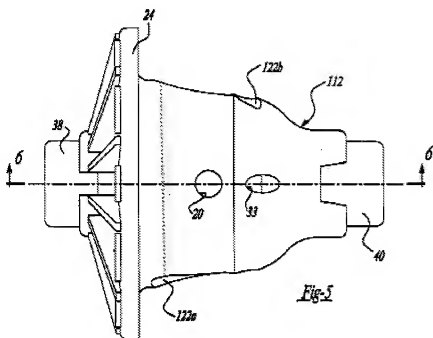
Regarding claim 23, Downs et al. discloses the curvature of radii of each of the corner portions is different than a curvature of radii of a respectively adjacent corner portions (see fig.3)

Regarding claim 24, the combination set forth above discloses the adjacent corner portions to the first corner portion are capable of not being heat treated corner portions since the stress concentrations on these corner portions do not require the heat treatment. Thus it would have been obvious to not heat treat the adjacent corners to the first corner.

Regarding claim 26, Downs et al. discloses a third corner portion not adjacent the first corner portion (fig.3, 152 upper right portion), the fatigue life of the casing is also further increased at the third corner portion (due to the shape of the third corner portion, its fatigue life would be increased accordingly as it is for the first corner portion. Additionally, heat treatment could be performed to the third corner portion).

Regarding claim 27, Downs et al. discloses an output portion (fig.3, 40) provided to the casing opposite the input portion; and a third corner portion (fig.3, 152) of the opening that has a curvature of radius larger than a curvature of radius of an adjacent corner portion and that is located farther from the input portion than from the output portion, wherein the second corner portion (fig.3, 154) is adjacent to the third corner portion and located farther from the input portion than from the output portion, the opening is a first opening (fig.3 shows the first opening), wherein the casing includes a second opening (fig.4, shows a second opening identically dimensioned) identically dimensioned as the first opening; wherein the support member includes a first hole

(fig.5 and 6, holes 20) and a second hole (fig.5 and 6, hole 20), and wherein a circumferential distance around the casing between the first opening and the first hole is greater than a circumferential distance around the casing between the second opening and the first hole (see fig. 5 below; in order to define a circumferential distance, you must first define a circumferential line in order to measure that distance. As can be seen clearly below, the portion of the red circumferential line above line 6 would be larger than the portion of the red circumferential line below line 6 and thus Downs et al. reads on the limitation. The openings in applicant's invention are also mirror images and thus would share the same characteristics as the prior art. Downs et al. simply does not show a cross-section view according to applicant's figure 5, otherwise the relationship of the circumferential distances would be even more clearly evident.) and wherein a thickness of the casing in the given rotational direction at the third corner portion is larger than a thickness of the casing in the given rotational direction at the second corner portion (as seen in fig.3, as a result of the geometry of hole the thicknesses of the casing at the third corner would be larger than at the second corner).



Claims 19-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Downs et al. (USP 5951431) in view of Gage et al. (USP 6139462), and further in view of Fushimi et al. (EP 0371340), as applied to claim 15 above, and further in view of Dison et al. (USP 4038189).

Regarding claims 19 and 20, Downs et al. fails to disclose the casing includes a physically treated corner portion of the opening and that the first corner portion is the physically treated corner portion.

Dison et al. teaches the use of physical treatment to materials in order to eliminate residual stresses and promote stress concentration uniformity (col.1, lines 29-34).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the first corner of the opening disclosed by Downs et al. with the physical treatment as taught by Dison et al. in order to eliminate residual stresses and promote stress concentration uniformity (col.1, lines 29-34). The first and third (fig.3, 152; upper right corner) corners experience higher tensile stresses due to the nature of the design and thus one of ordinary skill would understand in light of the teaching of Fushimi et al. that these corners would benefit from the treatment.

Regarding claim 21, Dison et al. discloses shot peening as the form of physical treatment (col.1, lines 29-34).

Regarding claim 22, Downs et al. discloses the opening further comprises a straight portion that is located closest to the output portion (fig.3, there is at least one very small straight portion located closest to the output portion; if one zooms into the opening far enough there would be a straight portion), and wherein the straight portion is perpendicular to the longitudinal rotational axis of the differential gear casing (fig.3, there is at least one very small straight portion perpendicular to the rotational axis at a point where the corner 155c beings to develop).

### ***Response to Arguments***

Applicant's arguments filed 11/17/2009 have been fully considered but they are not persuasive.

Applicant argues that Downs does not disclose that the fatigue life of the casing is increased by any particular geometry of the assembly windows. However, since

Downs discloses the geometry as claimed by the applicant, consequently it should result in the fatigue life being adjusted. Furthermore, Downs does disclose, for example, in the abstract "the assembly window permits easy assembly of the gear components into the differential case while improving the structural and functional characteristics thereof". One of ordinary skill in the art would understand that the structural characteristics thereof would imply mechanical properties / variables in the casing.

The rest of the arguments appear to be moot in light of the new grounds of rejection presented.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS DIAZ whose telephone number is (571)270-5461. The examiner can normally be reached on Monday-Friday 8:30am to 5:00pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas Diaz/  
Examiner, Art Unit 3656

/Richard WL Ridley/  
Supervisory Patent Examiner, Art Unit 3656